

1918

Construction accounts; Modern business report no. 95

Alexander Hamilton Institute

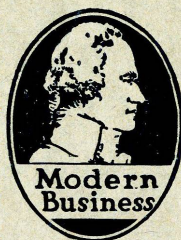
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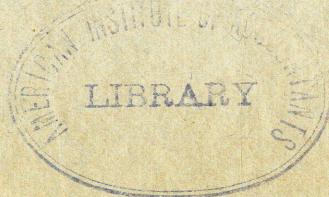
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CONSTRUCTION ACCOUNTS



REPORT No. 95

ALEXANDER HAMILTON INSTITUTE
ASTOR PLACE, NEW YORK



CONSTRUCTION ACCOUNTS



REPORT No. 95

ALEXANDER HAMILTON INSTITUTE
ASTOR PLACE, NEW YORK

CONSTRUCTION ACCOUNTS



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MODERN BUSINESS REPORT No. 95

ALEXANDER HAMILTON INSTITUTE
ASTOR PLACE, NEW YORK

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ASTOR PLACE, NEW YORK



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CONSTRUCTION ACCOUNTS

OUTLINE

	PAGE
I. PRELIMINARY DISCUSSION	5
1. Lump Sum Contracts	5
2. Cost Plus Contracts	6
II. RECORDS FURNISHED TO THE CENTRAL ACCOUNTING OFFICE	8
1. Timekeeping	8
2. Material Received	11
3. Car Shipments Received	11
4. Equipment	12
5. Loans of Labor and Material	13
6. Transfers from Stores	13
7. Accident Reports	15
8. Cost Accounting	15
9. Summary of Cost Accounts	22
10. Equipment Rental	24
III. ACCOUNTING IN THE CENTRAL OFFICE	27
1. The Purchase Order	27
2. Charges to Sub-Contractors	28
3. Report of Freight Shipments	29
4. Equipment Records	29
5. Pay-Roll Department	32
6. Commissary Sales	33
7. Compensation Department	34
8. Vouchers for All Payments	35
9. Statement to Client	36
10. Superintendent's Progress Reports	37
11. Accounts Payable	38
12. The General Ledger	39

PREFATORY NOTE

It is recognized that the contracting business whether under the lump sum or cost plus method is as much in need of scientific accounting as any other business. In the first instance the accounting records can be used with safety in estimating, in the second case cost records may be available to satisfy a questioning client. Oftentimes the value of proper construction records has been overlooked.

An effort has been made in this Report to give practical advice on cost problems of construction companies.

The scope of this Report is such that it is adequate for use in large business organizations. Small concerns will find adaptations more advantageous and economical. In every case the principles laid down in this Report and the system outlined can be used as the examples to follow.

CONSTRUCTION ACCOUNTS

PRELIMINARY DISCUSSION

The accounting procedure for any business involves every department and is inextricably interwoven with the executive details of the business. It is not our intention to go into every detail of construction work in order to explain the necessary features of construction accounting; nevertheless it is necessary to show in some degree how the accounting department is linked up with the two other main departments of construction work, the engineering and purchasing departments. Most persons are accustomed to thinking of construction as being mainly an engineering proposition. This, however, is not the case, as the purchasing and accounting departments are almost, if not altogether, of equal importance.

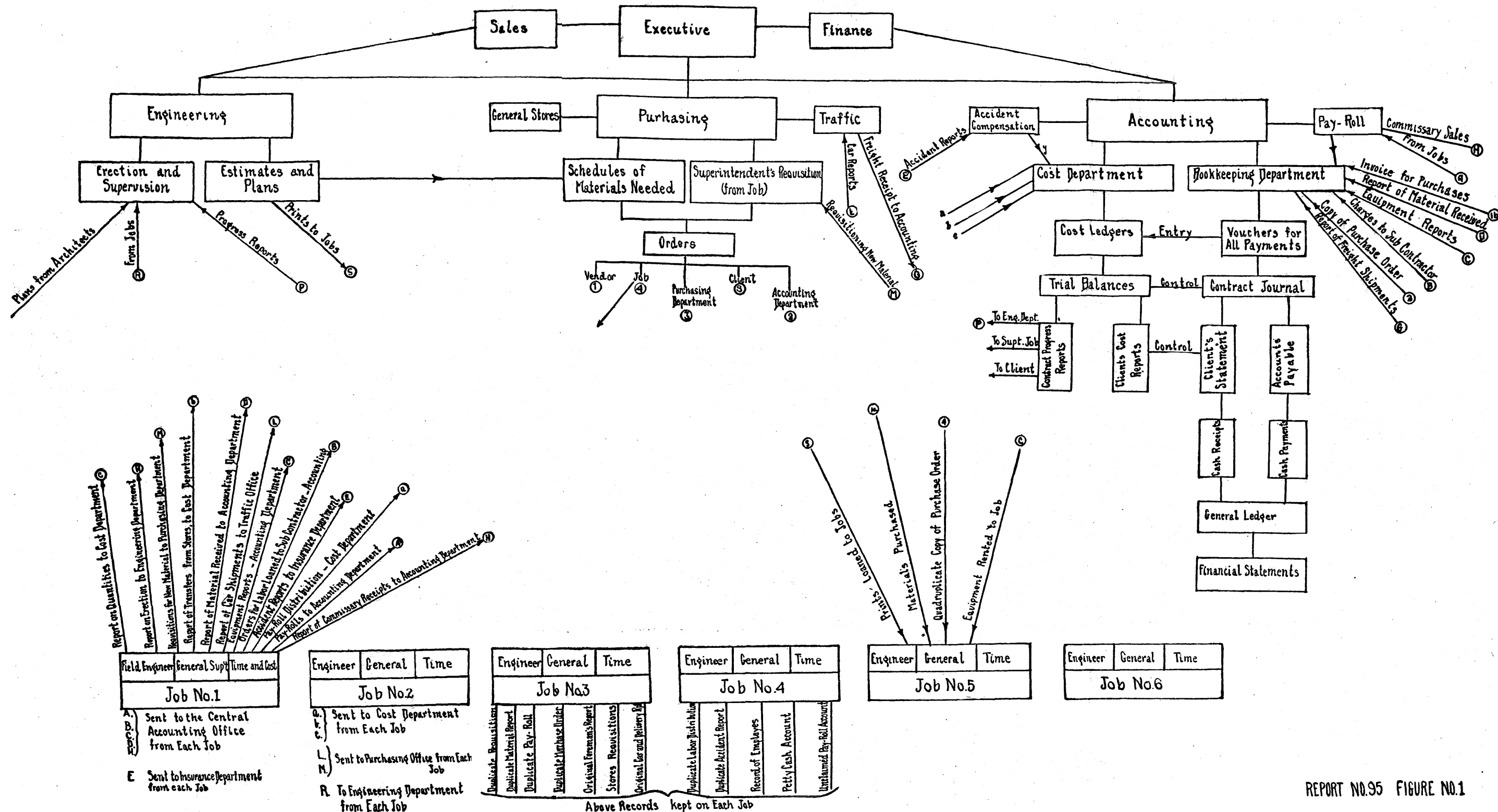
The chart (see Figure 1) has been drawn with the purpose in mind of showing how the accounting division is linked up with the other main divisions of construction work and to show the relation of the accounting division to the various contracts which are here delineated as job number 1, 2, etc. There are a great many details of purchasing and engineering which we are not including because we feel that they are not essential in the consideration of accounts. The chart shows the executive department with its two branches, selling and financing, as governing the entire organization. The selling department is linked up more particularly with the engineering, whereas the finance department, under the supervision of the treasurer, has direct charge of the accounting work.

The purchasing department is, in a way, the connecting link between the engineering and accounting divisions.

Lump Sum Contracts.—It is perhaps more logical to start with the placing of the contract and trace the inception of the records which form the basis of the transactions in the central accounting department.

The sales department secures a contract. The classes of contracts may vary widely according to the character of the work to be done. One standard method, frequently availed of among municipalities and business concerns is to secure bids on specifications furnished to the client's architect or engineer and award the contract on the basis of the lowest "lump sum" bid. At times when market conditions for labor and materials is erratic, such as during the Great War, this plan is, from the contractor's viewpoint, disadvantageous. Among the criticisms to which this method is subject, is the fact that it is often more costly than necessary despite the keen competition, because a bidder must protect himself against a probable rise in prices, against mistakes of architects and engineers, against unforeseen local conditions and engineering difficulties, against possible forfeits, and he must remunerate himself for taking the financial risk and for securing the capital necessary to proceed with the job until such time as payments are to be made. The lump sum method throws the entire burden of financing and risk of handling the contract on the shoulders of the contractor, which makes another problem for him to consider. If the contractor had to carry the investment himself until his client was prepared to pay it would no doubt be a serious financial strain. As a matter of fact, the contractor, in most instances passes along the burden of financing operations. Thru arrangements with the bank and creditors he is enabled to avoid any strain and carry thru his work. The expense of obtaining financial assistance from the bank will, of course, have to be figured in along with the other charges at the time the contract is made. Under this plan, the client is protected against overcharge by competition and the contractor by scientific estimates based upon experience.

Cost Plus Contracts.—A certain amount of work at the present time is done on the "cost plus percentage" basis. This plan eliminates competition to a great extent except in the matter of perfection of organization. Many disadvantages of "lump sum" work can be avoided in "cost plus" work by a proper system of inspection and cost reports. Yet on the other hand it has been found by experience that cost plus work is usually more extravagant than lump sum. A proper system of accounting, however, will show every item of cost and where it is applied. One's own engineers may determine the legitimacy of such items and one's own inspectors may have the



REPORT NO.95 FIGURE NO.1

authority to refuse the approval of any items of cost that are considered illegitimate. The contracts usually provide a certain percentage averaging from 30 to 50 per cent of the profit to be retained by the client until such time as the work is finished and accepted by the client's inspectors and architects. This provision gives the owner ample opportunity to protect himself against imperfections that may be unforeseen at the time the contract is in progress or against failure of the contractor to complete his work properly. On the other hand it gives the contractor remuneration for expenses that he has incurred in favor of the owner, together with a portion of his profit, to which he is undoubtedly entitled, as the work proceeds to completion.

The owner, on letting a contract on the "cost plus percentage" basis, may make stringent stipulations as to the form in which his bills shall be submitted to him. The contractor who is best fitted to submit clear, concise and accurate reports will find highest favor in obtaining "cost plus" contracts. In letting contracts on this basis, the owner will find it greatly to his advantage to have his reports rendered so that the items may be entered on his own plant and equipment accounts without necessitating any further calculation. The contractor will find it to his advantage to keep his costs in such shape that he may not only check the daily progress of the work but satisfy his client and the client's inspector regarding the legitimacy of his expenditures. This will remove any possible charge of extravagance or "padding." The methods of procuring these results will be detailed under the consideration of cost accounts.

It will be necessary, no matter on what basis the contract is placed, for the contractor to finance the work for a certain period of time. Arrangements are therefore made thru the finance department to provide for payments of pay-rolls and purchases of materials until such time as the first payment is due from the client. Plans are furnished by the architect which are checked and digested in the department of erection and supervision, copies of these plans are made and furnished to the superintendent of the field. It devolves upon the superintendent to secure his field organization, altho it may be furnished largely by the field office, but if he prefers he may secure his entire force as he is supreme and assumes all responsibility for the management of the contract. The proper equipment is furnished to the job on requisition of the superintendent from the company's storehouse. Necessary

materials have previously been secured from schedules made from plans furnished by the engineering department and these are delivered at the site of the work. The labor is secured by the superintendent and his foremen and the job is under way.

RECORDS FURNISHED TO THE CENTRAL ACCOUNTING OFFICE.

These records consist of the reports shown by lines diverging from job number 1 on the chart, and lettered A, B, C, D and H. The pay-roll is made up by the timekeeper in triplicate, if the job is a "cost plus percentage" job; in duplicate, if the job is a "lump sum" contract. This is O. K.'d by the superintendent and sent to the pay-roll division of the accounting department every week or two weeks as the case may be. The rates are checked and the number of employes compared with the force account, which is compiled by the cost clerk and the field checker, and a check is drawn to cover the exact amount of the pay-roll. This check is sent to the superintendent on the job who attends to the filling of the envelops. If the contract is not too far removed from the central office it is even better to have the pay envelops filled in the central office and distributed on the job by a paymaster who has no other connection with the contract. In no case is it proper to have the same person who makes up the time sheets handle the cash or the envelops.

Timekeeping.—The method of timekeeping usually found most satisfactory on a construction job is the check system. The employe, who is identified by a badge or button bearing his number, calls at the timekeeper's window at the hour of going to work and is given a small brass check corresponding in number to his identification badge. This check is taken from its hook on the time board, which also bears a like number. After the hour has passed for the shift to start work, the window is closed and no more checks are issued until the board has been read. All numbers whose checks have been removed, are credited with a half day on the daily check or tally sheet. Right here many of the methods differ, as the tally sheet is sometimes made in duplicate and one copy forwarded to the home office, but more frequently this is kept in a book and used by the timekeeper in making up his reports. The office tally sheet is further checked by a field timekeeper, who makes the rounds of the job several times during the course of the day and checks all the men at their work, as well as the particular operation on which they are working.

When the man receives his time check at the window, he takes it to the tool house and leaves it, getting whatever tools he needs for his work. The check is placed on a board similar to the time board and with the check is placed a small cardboard disc bearing the name of the article issued to the workman. At the close of the work the tool must be returned before the man receives his check again. If not returned a charge ticket goes to the timekeeper and the necessary deduction is made from the workman's pay. When he receives his check from the tool clerk he deposits this with the timekeeper, who replaces it on its hook and then rechecks the board, if necessary, to catch any overtime work.

Each day the timekeeper takes his tally sheet of the previous day and extends the number of hours each man worked in terms of money; in other words, he figures the pay each day and inserts this on a check sheet opposite the workman's number. This serves the double advantage of enabling a superintendent to tell exactly how his pay-roll is running and at the end of the week saves difficulty in proving up the time sheets for the home office. The timekeeper at the close of the day period makes up his time sheet, which provides a place for the man's number and in some cases his name, the number of hours worked each day and the rate. This is extended; then a column is left for deductions, such as board, lost tools, railroad fares paid to work, etc., and the net amount is carried to the extreme right. These sheets are usually verified by the foreman or superintendent, who keeps his records from his foremen's daily reports; when signed by him, the sheet is forwarded to the home office, where it is checked and the money drawn to cover it. If the job is a "cost plus percentage," the time sheets are usually made out in triplicate, one copy being forwarded with bill to client.

The majority of cases of mismanagement and fraud connected with contracting jobs have occurred with the timekeeping department, and it is usually the practice to bond the timekeepers and paymasters on large jobs. A pay-roll can be safeguarded so that the chances for defalcations are reduced to a negligible quantity. The byword, however, holds good that "no system has ever been invented that can't be beaten." The labor element is approximately 50% of the average construction job. Therefore, it behooves the manager to protect himself and his men with all possible safeguards. The cost distribution, made from the foremen's daily reports and mentioned in a later paragraph, is useful in accomplishing this purpose.

It might be worth while to outline a little scheme sometimes used for defrauding the pay-roll. The connivance of a general foreman, at least one sub-foreman, a night checker and the commissary clerk are necessary to bring this about; therefore, it is not usual. The men draw their checks for night work and go down to the company boarding house where they are tallied and treated by the commissary clerk. They lodge in the bunk houses and return the checks on the following morning. They are not allowed to receive the money themselves, but a bill corresponding to their overtime is run up against each laborer and tallied by the commissary clerk, who receives the money. Only a small part of this amount—say 10 to 25%—is paid to the laborer. This is made easy by the so-called padrone system which is largely in vogue among the foreign labor element, where a sub-foreman has his own following and controls the actions of his men. This can only be detected by a careful scrutiny of the progress of the work and a close supervision of the time checkers.

Some of the large corporations have followed the practice of putting detectives on their pay-roll, who watch the pay-roll lines and check up to make certain that working men do not go from window to window and draw more than one week's pay for one week's work.

During the war one large shipyard discovered a number of men registering with timekeepers on different jobs and because of the size of the work they were able to check in and check out of each job without being missed. In this way, according to the timekeeper's records there would be two men working where in reality there was only one.

The cost clerk takes the foremen's reports and checks them against his field check to determine if the foreman or himself has failed to account for every man. The rate is then penciled on each report and the hours extended in summary form for each job, each day. The total hours shown on these summary sheets multiplied by their respective rates give the total pay-roll for that day, which should balance with the daily pay-roll check. When dealing with fractional rates the small adjustment of a few cents may be necessary. When balanced, these summaries are condensed to a distribution sheet such as shown in Figure 3 (page 19) which is represented on the Chart (Figure 1) as line (a). The original of this is sent to the central cost department and the duplicate is sent to the client in "cost plus" work, or held on the job. The original of the foremen's reports are

filed on the job, as are the summary sheets so that there is no reason why more than two copies of the report should be made.

Material Received.—Material received on the job comes, as previously explained, from orders made out in the central purchasing department. These orders are the result of schedules sent from the engineering department, or arise from requisitions sent from the job (see (1) to (5) under “Orders” on Figure 1). Five copies of these orders are made, the first going to the vendor, which is substantially a contract and, in case of an order to a sub-contractor to do a portion of the work, contains the liability clause and contract price, and bears the essential form and wording of a contract. The second copy is sent to the bookkeeping department, where it is placed in an unfilled order file, to be used for checking incoming invoices when the goods have been shipped. The third copy remains in the purchasing department, where it is filed and referred to by its serial number. The fourth copy of the order goes to the job, where it is checked with a duplicate of the requisition and likewise filed in an “unfilled order” binder. The fifth copy goes to the client or, if this is not required, is kept in the purchasing department in an alphabetical file.

When the goods are received on the job, the job-copy of the order is referred to and the material checked up as to quantity and quality. The date of receiving and quantity received are noted on the job-copy of the order. This then becomes the basis for a receiving report which is given a number, this number being noted on the order. The order number is also marked on the receiving report, together with the name of the shipper and amount received. This report is made out in duplicate—one copy being sent to the central bookkeeping office and one being kept on the job. The job-copy of the order is only transferred to the “filled order” binder when shipments have been entirely completed. This obviates any danger of completed shipments being reported twice and if all filled orders are noted with the number of the receiving report, this will automatically prevent any chance of a shipment remaining unreported. These unfilled order records and receiving reports are of extreme importance, as the checking of all invoices for the contract at the central office depends upon their accuracy.

Car Shipments Received.—These (as well as all other shipments) are disposed of in the same way, but a special car record should be kept on the job, classified as to brick, stone, cement, steel, etc., and a report of all cars received must be sent out to the central traffic office,

to which freight bills should be forwarded. The car record should have a space allotted for shippers' names, purchase order number, car number and initials, time of entry, time of release, number of receiving report on which material is reported, etc. This report is forwarded daily to the central traffic office connected with the purchasing department. Freight bills are received first at this office, where they are entered on the car record. This is in addition to the information forwarded from the job, contains a space for "pro" (progressive) number, date of bill and amount of charges, which are taken from the freight bill itself. The car record is compared with outstanding orders for the purpose of tracing and speeding up back shipments. When the necessary information has been obtained by the traffic office, the freight bills are forwarded to the accounting office where they are vouchered, numbered and paid. The number of the voucher paying for the material is also stamped on the freight bill. When these are receipted they are returned to the traffic office where they are kept on file and may easily be found if necessary to substantiate any claim. The completeness of the record in the traffic department minimizes the danger of two freight bills being passed for the same shipment and if such a thing should happen the accessibility of receipted bills makes it easy to secure refunds.

Equipment.—Equipment is rented to the job by the central office or leased from other companies while as an offset to these charges idle equipment is sometimes rented to others. The rental rates are usually based on the cost plus upkeep for one year with a view to writing off the entire cost within a year, as the rate of depreciation on construction machinery is very high and the earning period correspondingly short. When equipment (meaning by that term such items as derricks, pumps, mixers, engines, etc.) is received by the job or sent from one job to another, the central office is notified and a location card bearing the name of the piece of equipment is filed under the contract to which the article has been sent. The cards are marked with the number of the job to which the piece has gone and the date it was received on that job. When finished with the equipment, the job notifies the central office and requests shipping directions. The date the equipment is ordered off the job is also noted on the location card and it is transferred to the file of another job or to the storehouse file. The record of rental received is not kept on this card but on a ledger card, which is numbered serially, this number

corresponding with the number-plate on the equipment and a like number on the location card. A copy of this card is given (p. 30) in the description of the procedure in the central office.

A list of equipment on rental is kept by the job on a form similar to the following: The serial number, which refers to the ledger card, is taken from the number-plate on the equipment itself, and a record of rental is kept by checking opposite the proper serial number each day that the article is in use. This is done by the field checker on his rounds. At the close of the month the sheet is signed and sent to the central office where it is checked by the location card and entered on the equipment ledger card.

Loans of Labor and Material.—Labor and material loaned to sub-contractors and outside companies is often the source of annoyance if not actual loss. Where this is done as a matter of accommodation, or during the course of a contract, the foreman or representative of the company using the labor, material or equipment, as the case may be, should sign a foreman's order in duplicate, giving all the details of the transaction. He takes the duplicate copy and leaves the original at the job office. The foreman of the borrowing company sends his duplicate to his home office, where a formal order is issued for the items called for on the foreman's requisition. The contractor forwards the original copy to the central accounting office of the lending company together with the pay-roll distributions. These distributions will show certain charges of so many hours each day to the company which has used the labor. Accompanying the distribution are the authorizations, so that it is an easy matter to make the charges against the sub-contractor. His own order will usually be made the basis of the invoices to him as he demands that all invoices shall bear his own order number.

Transfers from Stores.—These depend largely upon the size of the contract and results desired by the accounting department. If the job consists of numerous different operations, as building factories, tracks, roadways and bridges under one contract, it would be highly expedient to segregate the costs; a stores account and a bookkeeper would be a necessary adjunct of such a field organization. It may be that on some jobs, where it is desirable to keep stores accounts, the work may be combined with the work of timekeeping or tool checking; usually with the latter, as small tools are generally kept in a storehouse with such materials as bolts, ropes, cables, blocks, etc. Stores themselves

will consist of an infinite variety of material and will be delivered to the location most convenient to the place where they are to be used. It will be the duty of the storekeeper to check up and report their delivery, make proper entry in his records and take charge of all delivery tickets. For this purpose a delivery office near the main entrance to the work is necessary. All materials intended for stores will be so designated on the copy of the purchase order furnished to the job. A card record contains a place for purchases, orders, numbers, withdrawals, store requisition numbers and balances and such other information as date of purchase and cost. Such information as vendor, number of shipments and delivery tickets is noted on the purchase order and receiving report so need not be duplicated here. The idea is to maintain, on the job, a close running inventory of quantities on hand and amounts used. Of course the accuracy of this depends more on the reports of materials used than any other factor. To make this effective, close cooperation of foremen is necessary in reporting not only such items as cement, paint, brick, steel, but other items more difficult to count. The quantities and reports of work done, taken off daily by the field engineer, assist materially in this work. Furthermore, on concrete work or masonry if the cement is accurately reported this affords a close working check on the amount of stone, sand and lime used.

The quantities are taken from the back of the foremen's reports, checked with the engineer's report of work completed and entered on the store cards under the column of withdrawals. In the case of smaller items such as bolts, nails and oils, requisition tickets are made out by the storekeeper as these items are given out, and later entered on his cards when time or convenience permits. At least once a month, perhaps twice, he transfers his withdrawal entries for the period just preceding to the form of a journal entry and sends these entries to the central accounting office for transfer to the cost ledgers and adjustment of the material accounts. The journal vouchers for store transfers are in somewhat the following order:

<i>Dr.</i>		<i>Cr.</i>	
A/C No. Concrete		Job B—8372	
Curtain		{ Cement	
Wall		{ Sand	
A/C No. Piers		{ Stone	
		{ Cement	
		{ Sand	
		{ Stone	
		{ Steel Bars	

Reports of quantities of work performed were mentioned in a previous paragraph. This is more of an engineering proposition than an accounting matter, yet if the job is contracted for on the basis of so much per cubic yard of excavation or concrete, etc., the accounting department has to be made familiar with the progress of the engineering features just as the engineering department must know the cost per cubic yard or square foot, etc. The quantity figures furnished weekly or monthly also offer a check on the amount of materials reported as store transfers and this enables the cost accountants in the general office to readjust any discrepancies that may appear.

Accident Reports.—Reports of all accidents, however trivial they may seem, should be an infallible rule on every job. The timekeeper should gather from each employe at the time of his employment such information as name, age, married or single, number of children, if any, or nearest relation, together with a permanent address of some person who may be notified in case of serious accident or death. The idea of obtaining such information is to expedite the work of handling compensation cases. If the company is insured under a separate company, as one of the standard casualty companies, they demand immediate reports of all accidents and designate a resident physician to whom the employe is to be sent. If the construction company insures its own cases, the same steps are necessary and careful reports should be prepared of all injuries and forwarded without delay to the insurance department.

Cost Accounting.—There is a wide diversity of opinion among construction engineers as to the value of cost accounting, which has caused a great deal of argument pro and con. Many of the contractors contend that the cost and results obtained are not commensurate. They further contend that it is of no particular value from the contractors' point of view to know the cost of a certain piece of work inasmuch as the next job on which they bid (even tho it may be constructed of the same materials and be the same dimensions) will be built under vastly different conditions of labor, site and materials; thus any cost data obtained on former jobs would be worse than useless in making an estimate or checking costs on succeeding work.

There is considerable foundation for the above belief but there are many other circumstances to be taken into account. The comparison of unit costs on certain classes of work is fairly even if the proper allowances are made or proper percentage added in case materials or

labor are paid for at an advanced rate. The keeping of costs can not be done by a contractor in the sense that a manufacturer of standard articles would go about keeping his shop costs, but in checking the progress of a piece of work and in comparing the actual facts with the previously prepared estimate, a system of unit costs (as shown by superintendent's progress reports, which we will hereafter describe) is invaluable. In the case of lump sum work a client would be very desirous of having various items separated for the purpose of capitalizing these on his own books.

The books necessary for a complete cost system are as follows:

- Record of Labor Distribution
- Record of Materials Received
- Record of Orders Filled and Unfilled
- Storehouse Requisitions
- Journal Vouchers
- Cost Journal
- Cost Ledger

The quickest way to understand the application of the above books is to trace the entry thru each one to its final distribution in the ledger. Every night the foreman of each gang of laborers reports the jobs he has worked on during the day, the number of men and hours worked on the job, and in addition he reports the amount of materials for which he has made requisition. The foreman's reports are sorted according to days and distributed according to the rates paid for various classes of work. This distribution must balance with the daily pay-roll check. When this balance is made for the week these summaries, which also contain the class of work, are transferred to the record of labor distribution. (See Figure 2). These records are compared with the total of the pay-roll for the week, as shown by the daily check, and are then sorted according to the job numbers. The numbers of the cost accounts, to which the distribution is made, are marked opposite each figure to be posted and, as there are many duplications on account of the same operation being performed day after day, these sheets are condensed to a posting summary. This lessens the work of posting and the number of figures used, thereby lessening the chance for errors to occur. These summary sheets are posted directly into the cost ledger. The cost ledger consists of a sheet headed up to show the classification, the number of the account corresponding with the number on the posting medium, the building number and the clients distri-

May 15, 1920		Foreman W. P. Jones		Constr. Company			
Date		Foreman		Foreman's Report			
No.				Class of Work			
				Forms for C. Wall 8378	Forms for Piers 8378	Stripping Forms 8376	Scaffolding Brick 8376
605		5	3				
606		5	3				
607		5	3				
608					2	6	
609					2	6	
						</	

bution number. The columns are in duplex form—one each for labor and materials—under five blank headings. Each pair of columns may be headed up as desired. For instance, if the classification of the account is concrete forms, the page is headed “Concrete Forms.” The separate columns may be headed: Piers, Curtain-walls, Floors, Roof, Watertable, etc.

It will be of advantage to inscribe a simple code for numbering cost accounts. A code of this kind to be of value to a construction company should be elastic enough to be applicable to several different kinds of work as grading steel and concrete construction, brickwork, interior work or roadway and railroad work. A code similar to the Dewey classification seems the most practicable.

A separate ledger is usually kept for stores brought to the job, which is of the nature of a running inventory. This may be called a general stores ledger and as each invoice comes in it is checked with the duplicate order furnished by the purchasing agent to the job. It is subsequently vouchered and entered in a cost journal according to voucher number.

The cost journal is in columnar form. The column at the extreme left for the date, the next column for the voucher number, then a column for posting check, column for name, column for account number and a total column. The distribution on the page, which is usually a standard size of 17 inches by 11 inches, is headed in the following sequence: Sub-contract, General Stores, Tools and Supplies—the rest being divided under the head of job numbers, each column being left for the insertion of the jobs under way. (See Figure 3).

All invoices are entered in this journal after being properly vouchered and checked as to quantity received, prices, etc., and the proper job number is placed on the voucher; the name of the vendor is entered, the account, or accounts, to which the item is charged and the distribution is made to the necessary columns. This journal is used as a posting medium to the accounts payable ledger and likewise as a control for the cost ledgers; the total trial balances of the cost ledgers agree with the total of the columns in the cost journal. The one item which requires careful handling is that of pay-rolls. The amounts of the pay-rolls, chargeable to the separate jobs, are taken from the posting medium made from the distribution sheets. This posting is transferred to an office voucher, which is simply an adapted form of journal entry, the charge is made to job numbers, the credit

goes to "pay-roll" in the accounts payable ledger. The jobs are itemized under a journal charge in this fashion:

Job No. 200.....	\$1,445.00
Job No. 205.....	1,665.00
Job No. 208.....	2,105.00
Job No. 212.....	1,985.00
Job No. 215.....	2,800.00

Credit to Pay-Roll week ending May 5. . \$10,000.00

This is entered as follows: Date, May 5th; Voucher No. 775; Name, Pay-Roll. (This is duplicated five times, one entry being made in each column under the heading of the number of the job as enumerated above). The total of \$10,000 is carried into the total column. The amount posted to the pay-roll account is \$10,000. Each job is now charged with its proportion of the pay-roll; the distribution of this pay-roll is from the distribution sheets previously mentioned, the footing of the cost journal is merely a control for each job.

The materials are posted from the vouchers themselves instead of from the cost journal; this is an additional check on the accuracy of the entries made into the cost journal.

The trial balances of the cost ledgers, which are taken off separately for each job (i.e., 200, 205, 208, etc.) and show the classification of accounts—the total of the labor columns under each heading, the total of materials and the total of all columns—are taken off separately as follows:

JOB No. 200, 48" PIPE LINE				
<i>Acct.</i> No.	<i>Description</i>	<i>Labor</i>	<i>Material</i>	<i>Total</i>
1	General Expense		230.00	230.00
2	Liability Insurance		510.00	510.00
3	General Labor	165.00		165.00
4	Cleaning & Clearing	610.00	325.00	935.00
16	Temporary Water Line	120.00	80.00	200.00
34	R. R. Track to Dump	600.00	400.00	1000.00
42	Equipment Repairs	80.00		80.00
43	" Rental		800.00	800.00
44	Erecting & Moving Equip- ment	200.00		200.00
82	Excavation (Hand)	2400.00	200.00	2600.00
85	" (Steam Shovel)	2200.00	400.00	2600.00
90	Backfill	2200.00	800.00	3000.00
		<hr/> 8575.00	<hr/> 3745.00	<hr/> 12320.00

The above will give an idea of the form of the trial balance and the way the classification of accounts is worked. The total of this trial balance agrees with the total on the cost journal under column No. 200.

Summary of Cost Accounts.—This is made on a superintendent's progress report similar to Figure 4. The body of this report is divided into general, plant and direct erection groups. Trial balances are usually taken from the cost ledger and proved before they are entered on this report. In some cases it may be found simpler to transfer them from the cost ledger direct to the progress report if the reports do not have to be condensed. The actual quantities are furnished by the field engineer from measurements of work completed on the day of the report. These are entered in the proper column and calculation made and carried to the "actual unit cost" column. This report may be made out on the typewriter in triplicate. One copy is furnished to the superintendent; another, if necessary, to the client, inclosed with his cost statements and requisitions for payment. The original copy is sent to the home office where estimated quantities and estimated costs are filled in and a comparison made showing the loss or gain in each operation on the job in question.

The advantage of any system of costs lies in the ability to obtain simple, direct and immediate information therefrom. In the case of construction work, proper warning may be given before a job runs too far behind, if a cost system is carefully followed. Changes may then be effected in subsequent operations to retrench losses and make savings.

In "cost plus" work it frequently becomes necessary to satisfy the client that costs are accurate and reasonable. A method showing the direct application of costs to a particular piece of work will enable him to make his own comparisons and judge for himself regarding all expenditures.

In many classes of work it becomes desirable to make bids in unit price, as, so much per cubic yard or so much per square foot. If accounts are properly kept for excavation, concreting, form work, etc., the contractor will have easily available information for obtaining a reliable check on estimates for work of this class. If prices of labor and material have changed it is easy enough to allow a proper percentage to cover the change.

The accounts which compose the three groups on the superintendent's progress report are as follows: Under the "general group" will fall such indirect labor as superintendent, timekeeping, water-boys, clearing site, erection of temporary buildings and liability insurance. The "plant group" implies such accounts as temporary water lines, rental of equipment, bringing equipment to the job, erecting and removing equipment, oils and greases and necessary repairs. The "direct erection group" contains such accounts as are necessary to set forth the operations of erection. The individual circumstances will determine what accounts are necessary, but in a general way it would include:

Excavating	Base Plates	Plumbing
Pumping	Structural Steel	Steam Fitting
Backfill	Floors	Ventilating
Sheeting	Plank	Light & Wiring
Forms	Temporary Roofing	Stairways
Concreting	Brickwork	Machine Installation
Reinforcing Concrete	Roof Covering	Wood Block
Finishing Concrete	Roof Coping	Sills and Doors
Stripping	Painting	
Anchor Bolts	Interior Partitions	

Any one of these accounts may be subdivided under the forms in use as much as desired to show the cost of any particular operation.

The great responsibility for the accuracy of a system of this kind lies with the foremen and timekeepers on the various jobs. It is to the interest of the foreman to know his costs and maintain as careful a record as possible as well as to keep his costs at a low figure. It is not intended to throw any clerical burden on the foreman for it does not require a great amount of time each day for him to account for his men and show what they are doing. In distributing this work the timekeeper is materially assisted by the field check, which enables him to check the accuracy of the foreman's work. The timekeeper must be familiar with the outside operations and be able to tell from abbreviations on the foreman's report what work is being done and exercise judgment in checking such work. It is best to recruit the men in the home office, who have charge of the distribution of costs, from timekeepers and others familiar with field work, rather than from bookkeepers or men unfamiliar with the technicalities of a construction job.

Equipment Rental.—The proper handling of equipment is a very important phase of construction work. It is on the plant account that a great many losses creep in that are hard to foresee and hard to uncover. A record should be made of all equipment purchased on the job or furnished to the job by the construction company, together with full details regarding date of purchase or arrival on the job, classification of equipment rental rates, necessary repairs, income derived, etc. The forms given in Figure 5a and 5b (pages 30 and 31) have served very satisfactorily as a simple record of equipment.

The company commissary or boarding house is often a very necessary feature of work that is removed from cities or towns, as railroad or waterway construction, or located in places where board and lodging are at prohibitive prices. It may also be desirable to concentrate labor in a camp to prevent competitors from hiring them away.

Materials for commissary use are purchased thru the regular channels, and designated for commissary use. When the orders reach the accounting department they are taken care of separately as will be explained later. The tickets for the employes' use are issued by the accounting department to the job and numbered serially. The time-keeper on each job attends to the distribution of tickets if the number of employes is not too large—otherwise a commissary clerk must be secured who will issue tickets, take supply inventories and see that no food is sold that is not accounted for by a punch mark on the tickets outstanding. The meals are in the majority of cases sold at cost when the company itself runs the commissary, therefore a close check on receipts and stock on hand (making due allowance for waste) will be near enough to prevent any considerable leakage. The clerk makes a record of the number of the ticket issued and the number of the employe purchasing the ticket. He keeps a further record of employes' numbers, noting under each one the serial number of the ticket he buys. Before the pay-roll is made up, the clerk hands the time-keeper the commissary bill and he deducts from the wages due each, the amount of his commissary bill, carrying the net extension into the balance column. When a check is drawn to cover the pay-roll it covers only this net figure: journal entry is made charging the contract's pay-roll account and crediting the contractor's account for commissary receipts or sales.

Refunds on commissary tickets made to persons leaving the job,

yet holding partially unused tickets, are paid from petty cash, and the central office "commissary allowance" is charged.

Before passing to the accounting practice in the central office and the assembling of the records from the various contracts, a final word may be said about the records kept on the job and the manner of keeping them. The timekeeper on the job will have a petty cash fund from which to pay discharged employes and small items of office expense, such as expressage on supplies and carfare. The fewer items paid in this way the more satisfactory will be the management of the office affairs on the job and the less likelihood of petty graft and extravagance. The method of refunding petty cash vouchers once a month in order to keep the fund at a certain figure will be found most satisfactory.

The timekeeper will also keep a record of all employes coming to the job and leaving, thus enabling him, in case of accident, to notify the proper relatives, also to identify and weed out undesirables in case of labor troubles.

All envelopes containing unclaimed wages should be held intact for a sufficient length of time to warrant the belief that they will not be called for, then carefully registered in the petty cash book or some permanently bound book and returned with a report to the main office. These items should be investigated carefully by the inspector when making his rounds.

Duplicate accident reports are kept for the purpose of aiding the insurance department in checking bills for medical services, determining compensation, frequency of injuries, etc.

Car and delivery records are kept to prevent overpayment of freight bills, to check demurrage and prevent unjust demurrage charges, and facilitate charging freight to proper cost accounts. Consignments to sub-contractors often come in care of the general contractor and it is necessary that he keep a complete record in order to make his charges to these sub-contractors. A complete record would consist of car initials and numbers, "pro" number of bill, point of shipment, contents and weight of car, date of receipt, track number on which car is placed, date of unloading and amount of bill. Dealers' and draymen's delivery tickets are kept, as dealers use these in making their charges, and when many shipments of the same class of materials are made these are necessary in order to identify the numerous charges.

Store requisitions are kept as the basis of charges from stores

or supplies account to job numbers. These are all carefully marked with quantity prices and extended; later, probably once a month, they are summarized and charged to cost accounts.

The original foremen's reports are carefully kept to support the distribution of labor items to various jobs. They are also useful to the inspector in checking pay-rolls. Many concerns make a practice of having these filled out in duplicate and sent to the main office, but this is unnecessary if proper distributions are made out and returned by the cost accountant and the labor slips are filed by date so that in case of discrepancy they can be checked with the original distributions.

Duplicate pay-rolls are kept on the job for the purpose of enabling timekeepers to determine whether all wages have been paid in full and who has been paid.

Duplicate material reports of materials received are necessary for checking partial shipments, also for ascertaining material requirements and to assist in taking inventories of materials on hand.

Duplicate requisitions are kept to inform storekeepers of goods ordered for which confirmation orders have not been received from the purchasing department. In case a purchase order is lost in transmission and the accounting department receives an invoice for which there is no corresponding order, these duplicate requisitions are necessary to establish a confirmation and assist the purchasing and accounting departments to complete their records. Errors of this kind will occur when goods are ordered in emergency by a superintendent for the job, unless a confirmation order is sent at once from the main office—an invoice may come in without an order number owing to a delay in sending the confirmation. The storekeeper can refer to his requisition to show that goods have been ordered, and to his delivery ticket to show that goods have been received. This puts the burden of the omission up to the purchasing department and relieves the job of unjust criticism.

ACCOUNTING IN THE CENTRAL OFFICE.

Accounting in the central office is divided into two main divisions: namely, the bookkeeping department and the cost department. Duplicates of the records we have enumerated as being kept on the job (with the exception of the purchase order which originates in the purchasing department), are sent either to the bookkeeping or the cost departments. Those received in the bookkeeping department are indicated on the chart (Figure 1).

The Purchase Order.—This is the second of the five copies and is filed in an unfilled order binder which is checked daily with the report of material received on the various jobs. The date the material is received on the job is noted on the purchase order, the purchase order number is noted in turn on the receiving report for that date. When the invoice is received from the vendor who has previously received copy No. 1 of the purchase order, the unfilled order copy is referred to and the date on which the goods are received is noted on the invoice or on the voucher attached thereto, which contains the name of the vendor, the date the invoice is received, the date the goods were received, the O. K. of expenses, the O. K. of prices, and the approval for payment.

The quantity, the prices and other conditions of the sale are checked on the voucher which is posted to the invoice. In cost plus work creditors are requested to send invoices in *duplicate* so that the vouchered copy may be turned over to the client when a payment on the contract is requested.

It will be noted particularly that no invoices go to the purchasing department or to any other department than the accounting department. All information for checking these invoices is sent to the central accounting office. This prevents any loss of invoices; also any delay which may cause loss of advantageous discounts. The necessity of sending daily receiving records to the home office, as well as daily pay-roll records, has a good moral effect on the employes and urges them to keep their records strictly up to date.

It is contrary to good accounting practice to permit these invoices to be peddled or mailed from one department to another since they are the basis of all material charges to the contract and the basis of payment to the contract company by the client.

Charges to Sub-Contractors.—These charges may be either for labor or materials. If composed of the former they are taken from the pay-roll distribution; if made up of the latter, they are gathered from a material sold report emanating from the storekeeper. The material sold report is much like the report for material received. It does not, however, contain a space for the order number but instead of this, contains a space for a voucher on which such goods are charged to the sub-contractor and also a space for the sub-contractor's order number, thus giving all the information necessary for the purpose of billing.

Very frequently these charges are in dispute. Therefore they can not be credited immediately to the contract and charged to the sub-contractor, but are charged to a suspense account, bearing the sub-contractor's name.

This suspense account takes the place of one of the regular cost accounts, and report to the client shows that sub-contractor's account A B etc., is charged with so much labor and so much material which has not been paid for by the sub-contractor. If it is desirable to charge sub-contractors with an extra percentage for overhead or profit, the entry is made in the journal and the overhead or profit is charged to the sub-contractor's suspense account and credited to an account called "overhead on special orders," or "profit on special orders," as the case may be. This profit belongs only to the contractor, as it stands in lieu of percentage he would receive from his client.

Inasmuch as the trial balances of the cost ledgers are the basis of statements rendered to the client, any overhead charges of the central office or charges for profit to sub-contractors are not proper charges to the contract, and, therefore, can not be included in these trial balances. The ledger pages for the suspense accounts, however, may contain an extra column aside from those for labor and materials which may be used for such miscellaneous charges. When a trial balance of a cost ledger is taken off only the labor and material is taken into account. However when it becomes necessary to bill the sub-contractor direct, the additional charges are included in the bill and credited to the suspense account and charged into accounts receivable.

These miscellaneous charges are controlled by the credit account entitled, "profit on special orders," and when a summary of trial balances is made, they can be listed separately under accounts receivable as miscellaneous or profit charges.

If the sub-contractor finds the bill sent to him correct he sends in an order authorizing the charge. The suspense account under the contract may be credited and the sub-contractor's account receivable may be charged. The profit on special orders will then be closed to profit and loss. If, however, the sub-contractor demurs to charges and adjustments are necessary some appropriate cost account will have to be charged instead of the contractor's account receivable. If precaution is taken by the timekeeper or storekeeper to secure the signature of the sub-contractor's agent when labor or materials are turned over to him, chances of dispute will be minimized and chances of collection much improved. The advantage of using these suspense accounts to receive sub-contractor's charges is obvious. The contractor is not forced to carry the charge until it is paid. In case of dispute this is an important point. Moreover his ledger account of receivables is not confused by numerous adjusting entries. Third, by segregating the charges the necessity of an ultimate analysis is forestalled.

Report of Freight Shipments.—All such reports are received from the jobs daily. These reports should contain the car number, the date on which the car was received, the date unloaded, and the date released. They should also contain the kind of material, the shipper, and the date of receiving report on which the goods are noted. These reports are entered in a freight record which is kept in columnar form, one set of columns for each of the several contracts, showing the car number, shipper and material for each contract. When the freight bills are received, they are checked against this book, the "pro" number of the freight bill being added, as well as the voucher on which the charge is made to the contract. It is very important that all bills for demurrage and reconsignment and any miscellaneous or extra charges be so noted in order that no duplications of car numbers or of pro numbers will be made. If a very large number of contracts are in process it is necessary to employ a traffic man to look up the cars and check freight shipments.

Equipment Records.—Reports are received from each job weekly regarding the pieces of equipment in use. These are all designated

Register No.

Description

Invoice No.

Estimated Life

Cost Price

Rate Depreciation

TOTAL

Reverse side for rental detail.

(Size of card 5"x 8").

FIGURE 5A. REPORT 95

RECORD OF EQUIPMENT ON RENTAL

(To be filled in by Field Checker - Idle Time in red ink.)

Month	1	2	3	4	5	6	28	29	30	31	Total Idle	Total Worked
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

FIGURE 5B. REPORT 95

by numbers. A notation is made on the card bearing the number of each piece of equipment in use on the job, and at the close of each month this card is made the basis of a bill to the contract for the amount of plant charge during that month. When use of the equipment is finished and it is needed no longer on that job, a report is made to the central office so that it may be transferred to another job or to the storehouse as the engineer in charge may decide.

A file of the equipment cards which will show the number of pieces in use on the job and the income derived therefrom may be kept by contracts. The cost of transporting to and from the job and erecting equipment on the job are charged direct to the equipment accounts on the cost ledger for each contract. A sample equipment card is shown in Figures 5a and 5b. It gives the necessary data for charging depreciation and for determining the amount of rental to be charged. Repairs to equipment are usually paid for by the contractor's client in cost plus work. A column, however, should be provided on each equipment card for repairs, as the plant may be at work on a lump sum job during part of the time, in which case the cost of repairs will have to be borne by the job itself.

Pay-Roll Department.—The pay-roll department of the central office will probably have a large number of contracts to audit and should be separately organized as a department distinct from the book-keeping department. Daily force accounts for each job are received, showing classification and rates of all workers. When the weekly pay-roll sheets made up by the timekeeper and signed by the superintendent are received, they are checked with the daily force accounts. At the time the daily force accounts are received in the pay-roll department, the pay-roll distribution for the same is received by the cost department. A check of this should be furnished at the same time by the job to the pay-roll department so that the amount entered by the cost department and the amount entered by the pay-roll department may be the same.

If the envelopes are made up in the central office by the pay-roll department, as may be the case if the jobs are near at hand, a representative of this department can go on the job personally and pay off the men. It may be necessary, however, to mail a check to each job and make arrangements thru some local bank for cashing the check, in which case a representative of the superintendent of the job will make up the envelopes and pay off. The traveling auditor of the com-

pany will make his rounds of the job at odd times and make up the envelops himself and pay off the men, thus making a complete check and audit of the timekeeper's account and the number of men on the job. As has been previously explained, too much care can not be exercised in checking the number of men on the job and the number of names appearing on the pay-roll.

There is also a tendency, at times, for a timekeeper or foreman to favor certain men by allowing them extra time or failing to dock them when late. To obviate this difficulty timekeepers may be shifted from one job to another without notice, or a representative of the pay-roll department may take charge for a day or two, at irregular periods, to determine whether all men appear on the job at the proper time and whether they are paid the proper amount. On cost percentage jobs, the client will usually have a representative in the timekeeping department who will check with the timekeeper when pay-rolls are made up, and determine that each man is receiving the proper amount and is not overpaid. Records of pay-roll checks may also be sent from time to time to the pay-roll department, the original records being taken from the job and checked with the pay-roll sheet for the same week.

Commissary Sales.—Tickets should be issued by the pay-roll department to the commissary clerk and should be numbered serially. Each commissary clerk will be charged with the number of tickets received and should be made to account for them. All supplies purchased for each job should be charged to that job, commissary department. Inventories should be taken of supplies on hand once every month. Ticket sales should be reported weekly and a representative on the job should stamp or punch each ticket at meal-time. If the jobs run for any length of time, the sale of tickets will be fairly even and a certain amount of supplies will be kept continually on hand. The greater danger in the commissary department is that supplies may be sold off the job and sales not reported to the home office. To regulate this, all tickets refunded are punched and made void and returned to the main office. In some places the tickets are issued every day, the new tickets being given out and refunds made for all old tickets. This, however, entails a great deal of clerical work and does not seem necessary. It would be a better plan to issue the tickets for smaller amounts—say \$2.50. Reports will be made to the home office about as follows:

Tickets Issued to the Commissary Clerk (Give serial numbers and extension)	\$.....
Less Tickets Remaining on Hand	\$.....
Gross Sales	\$.....
Less Refunds (Per Tickets Returned)	\$.....
Net Sales (Per Cash Returned)	\$.....
Inventory of Supplies (Taken at beginning of month)	\$.....
Less Present Inventory	\$.....
Less Allowance for Natural Waste	\$.....
Add Percentage of Profit	\$.....
Sales for Period	\$.....

If the ticket charges are deducted in the main office pay-roll department, a report of tickets sold to each pay number must be entered on the pay-roll by the timekeeper who will furnish, on a separate slip, the ticket numbers. The total of tickets sold must agree with the deductions from the pay-roll. Refund will have to be handled thru the petty cash—the refund tickets accompany the voucher, and the petty cash fund is reimbursed.

Accuracy must be observed in checking the inventory of supplies.

It will be necessary at times for a representative of the pay-roll department to check this inventory and see that the goods reported are actually on hand.

Compensation Department.—In large organizations it will be necessary to have a separate compensation department. In smaller organizations this may be under the general pay-roll department. All reports of any accidents whatsoever, even those of minor character, should be sent to the compensation department. The insurance will usually be handled by an outside company, altho in very large companies the insurance is handled thru their own account. A doctor in the vicinity is designated either by the insurance company or by a construction company to look after all accidents on every job. One report of the accident will come from the doctor, another report will come from the superintendent or timekeeper on the job. When the man returns to work the timekeeper will make a further report which will show the amount of time lost and the amount of compensation due. It is necessary to follow up this department with a great deal of care to avoid any fraud or any laying off when the party is actually able to work. It is frequently necessary to secure the services of a specialist, such as an oculist or a surgeon. Arrangements should be made

to do this and have bills sent direct to the compensation department to be audited by them and then sent to the bookkeeping department. Bills for compensation, whether from the insurance company or from the compensation department, will be rendered to the bookkeeping department and charged to the job regularly each month. These are based on the distribution of the pay-roll made by the cost department. The insurance company will classify the labor into divisions according to the hazard in each occupation. The cost department will be able to secure from its books (keeping the accounts as specified previously) all the data for a complete classification. If the company insures itself it will charge a certain percentage based on past experience or on certain tables compiled by insurance companies, creating a reserve account for accidents and compensation insurance. All payments of compensation and the cost of running this department will be charged against this account.

Vouchers for all Payments.—As has been stated, these are made up by the bookkeeping department and are entered on a cost journal or contract journal. They are numbered consecutively—the number, the name of the vendor, the date of the bill, the total amount of the bill and the distribution of the bill being entered on the contract journal, in the column of the contract to which the item is charged. If there are very many contracts in process, it will probably be necessary to have a journal for each contract. When the vouchers are made up in duplicate, properly numbered, checked and entered by the bookkeeping department, the duplicates go to the cost department for entry on the cost ledger. The cost information necessary for posting should be contained on the duplicate copy of the order so that it may be transferred to the voucher and the duplicate when the invoices are checked. The duplicate invoice is stamped with a rubber stamp giving space for voucher number, original order number, cost distribution and O. K. of prices and extensions. These data are entered on cost ledgers by cost engineers or their assistants. If, in the light of information they may have, they find that the bookkeeping department has made an error in its distribution, this may be changed and noted plainly so that when returned to the bookkeeping department the change will be made on the original voucher. The vouchers are then taken by the bookkeeping department where the records are completed in the contract journal: the account numbers and the distribution must agree with the total already entered. By this method the

original records do not leave the bookkeeping department, the duplicates are assured of being like the originals in every particular, all vouchers are checked twice—once by the bookkeeping department and once by the cost department. The contract journal is made up from both original and duplicate so that chance for error is practically eliminated.

All bills are bound together in a suitable binder and ready to turn over to the client in support of statement to him.

Statement to Client.—There will be trial balances taken of the cost ledgers which will be controlled by the contract journal as the same entries have been made in the cost ledgers as have been made in the journals. The contract journal, as a summary on each series of bills, becomes the control for the cost ledgers. The statement may be called an invoice or a requisition. All bills will be numbered and will contain complete information as to the contract to which they are charged, and to the cost account to which the charge is made. A type-written statement will accompany each statement showing the complete number of vouchers and any distribution which the client may wish made regarding the cost.

The distribution is made from the trial balances of the cost ledgers which contain the client's account number and are condensed into as brief a form as he desires. This has been explained in the discussion of the records from the job point of view. If a large number of buildings are in process, it may be that the client will wish the cost kept by buildings only, or he may wish it kept by departments. This information may easily be secured by keeping the cost ledgers for each contract separate and numbering the ledger pages with the client's account number which will show his distribution, at the same time showing the construction company's account number. It will only be necessary, then, to summarize the account numbers shown on the vouchers for each building and place this in report form. It may be necessary to furnish the clients with a progressive total showing previous requisitions rendered on each job, the total of present requisitions and the total to date.

The total of present requisitions is made in summary form, footed, and all discounts to which the client is entitled are deducted. The full percentage is then added to this. If the contract provides for a retained percentage, this is deducted, giving the net amount of the requisition. It may be necessary to add that on some sub-contracts

let thru a general contractor the general contractor is entitled to a less percentage than on work which he himself performs. This may be kept separate—by entering the amounts of sub-contractor bills in the column provided for that purpose.

It may be well to give a form for proof sheet of trial balances; this will be found helpful before using the trial balances to make up statements to the clients.

Job No.	Previous Requisition	Labor added during Period	Material added during Period	Material & store & transfers	Total in Requisition	Total to Date
---------	-------------------------	------------------------------------	---------------------------------------	------------------------------------	----------------------------	---------------------

By comparing the total for requisition with the contract journal and adding this to previous total in the contract journal, a new figure will be obtained for total cost to date which should agree with total of all trial balances. The total of all trial balances should agree with total of charges to cost of contract account in the general ledger.

Superintendent's Progress Reports.—While discussing these trial balances and statements to the client it may be well to take up the form of a report on a “lump sum” or “estimate” or “unit price” contract. The basis of such a report is a record such as may be kept on the form shown in Figure 4, page 21. This information is sent to the engineering department, to the superintendent on the job and usually, in a modified form, to the client or his architect. In lump sum work the architect's certificate for payment will be placed on a report of such a nature as to show the progress of the job. The superintendent will find abundant material in a report of this kind to speed up or direct his work. The engineering department will find such a report useful in controlling the progress and determining the capabilities of the field force. If accurately compiled the report should show how a job is breaking in time to prevent leaks or losses.

This is the chief aim of a cost department and ought to prove a source of enlightenment to both the executive and engineering departments. If the progress report is kept on a “cost plus” contract it should satisfy the client that such a method of procedure is not any more extravagant than the “lump sum” method. It will furnish the contractor with the means of preventing extravagance by enabling him to make comparison with his lump sum and unit price jobs. As previously pointed out, comparisons of costs in the building business require more than merely charging so much labor and materials to a

job number. The real comparison is the work of a person who can combine a knowledge of engineering problems with a knowledge of the bookkeeping and accounting features. Each has its limitations and without the aid of the other is of little value.

The man in the field must check his quantities and for this purpose a checker who can allocate labor and materials properly without the necessity of depending on foremen for all the information, is a prime necessity if workable cost records are desired. Such a person may be found in the young man of engineering training who is taught the office end of the work and can appreciate the value of accurate and complete records.

Accounts Payable.—These are posted from the contract journal; credit is made to accounts payable; the charge is made by journal entry in total to cost of contract at the time each requisition is made. The checks paying bills on that requisition may also be made out; the number is inserted on the voucher accompanying the bill to the client. The client may then, if desired, audit paid vouchers and determine whether all bills made out to him have been paid by the construction company. In some cases, this matter is placed in the hands of a banker or a third party who O. K.'s all bills rendered to the client by the construction company, and makes all the payments, paying over all accumulated profits to the construction company. There is no reason, however, if the construction company's organization is properly equipped why it should not handle its own finances with proper auditing by the client. A separate check book or checking account may be kept for each contract, or if the contracts are very small a series of check numbers differing from the company's regular expense checks may be used for designating payments on the accounts of certain contracts. A cash book may be kept for each contract, and the accounts payable for contracts may be charged from this cash book. It is not necessary, however, to keep more than one accounts payable ledger or one account with every company, because these may be posted from any one of several cash books representing the payments on the accounts of any of the contracts. A cash control account will be kept in the general ledger, to which the balance on each cash book may be posted.

Receipts of cash will likewise be charged in these contract cash books if desired for any of the contracts in process. If they arise from some miscellaneous source, not directly connected with any contract,

as the sale of some material from the storehouse or rental of odd pieces of equipment, they may be entered in a miscellaneous cash book. The accounts receivable will consist mostly of client's accounts. The other accounts such as sub-contractors' accounts will in most cases be both accounts receivable and payable—the debits arising from counter charges for labor and materials sold to them. It is necessary to keep such items in one account to avoid over-paying a sub-contractor on his contract when there are outstanding items charged to him.

A statement is rendered to the client, as we have explained, made up of vouchered invoices which have been paid, of a distribution of costs, and a list of discounts taken. Vouchers or duplicate pay-roll schedules, duplicate purchase orders and duplicate receiving reports may also be included. The client's contract amount will be charged and an account "requisition to client No. 1" or "client No. 2" will be credited by journal entry. The amount of the credit to this account will contain whatever percentage is added for profit. The journal entry covering the cost journal account will be as follows:

Charge to "cost of contract No. 1" (or contract
No. 2 as the case may be) the actual total
of the contract journal for that date.
Credit same to accounts payable.

The difference, then, between the cost of contract No. 1 and the amount entered to the credit of requisition account No. 1 will be the profit on that contract at the date of closing. These accounts will be kept in a general ledger and summarized in a total requisition account or unfinished contract account.

The General Ledger.—The general ledger may contain accounts for loans or money advanced to separate contracts, also such accounts as profits on sales of material sold from contract, equipment receipts, commissary receipts and reserves of various characters as for compensation and insurance, depreciation of equipment, retained fee on contracts, forfeits on contracts. The retained fee reserve is the offsetting credit for a deferred charge to the client on account of fee due and payable upon completion or within a certain time thereafter. The reserve for insurance and compensation is usually contra to a fund for the purpose of defraying cost of injuries and doctor-bills. The reserve for forfeit will be the portion of a particular profit or may be a part taken from annual credits to profit and loss. The reserve for depreciation is usually set up annually or semi-annually, based on the cost and longevity of the equipment in question. The rates for pieces

of equipment differ considerably according to care, usage, amount of travel, weather conditions, improved devices, etc. But the rate is high even when the best care is exercised.

We shall have, then, in the general ledger a "cost of unfinished contracts," and an account called "requisitions" made on unfinished contracts." The general ledger will contain the other usual accounts, the only difficult question being the handling of discounts. Very frequently on cost plus percentage jobs it will be necessary to turn over to the client all discounts obtained from the use of his money. This is proper practice and such an account should be "discounts credited on requisitions." The "discounts taken" account will be credited from the cash book in the usual way. The journal entry may be made at the time of rendering a requisition to the client, debiting "discounts taken," and crediting "discounts credited on requisitions." Any difference appearing between these two accounts will show discounts taken properly belonging to the construction company and not to the client, or discounts which, for some accounting reason, have not been returned to the client. Such differences are subject to audit by the client or the company's auditor.

Financial statements may be made monthly or bi-monthly to the construction company's representative, showing the cost of unfinished contracts, the amount billed on unfinished contracts, amount retained and amount paid by client. In view of the fact that a large number of jobs are on hand and market conditions are constantly changing it may be necessary to call for statements more frequently than once a month. The bookkeeping department may arrange to show any of these reports each week in connection with the progress report on each job, made by the cost department. These reports will necessarily have to be compiled in conjunction with the cost and engineering departments as information of quantities and details of distribution of labor and material will be kept by those departments.

In summarizing this Report on construction accounting we have considered cost plus percentage work because it has been brought into the limelight by the war and the method of our government in the endeavor to secure quick results. The criticisms have been many—chiefly those of extravagance, incompetent mechanics receiving the wages of skilled men and wilful padding of expenses to augment the profits. The temptation however is no greater under "cost plus" work than under a fixed sum to "skin" contract. If a proper system of

accounting is maintained there is no doubt that all leaks due to extravagance or even dishonesty can be prevented. Competent inspection is a great aid. The question of skilled mechanics is the hardest of all and stands deep rooted in present economic conditions; no system of accounting or engineering can do much more than set its standards and constantly fight for their maintenance. The chart which we placed at the beginning may give a hint of the relationship that should exist between the jobs and the main office and the balance that should be maintained by the larger departments, that is, the engineering, purchasing and accounting departments. We have no desire to exalt accounting above its natural position but even in building railroads, bridges and factories the accountant is recognized as an indisputable production factor and indispensable to the proper conduct of the work.

NOTE: If you desire a more detailed discussion of any phase of this Report your inquiry will receive prompt attention in our Service Department.